Superconducting Hot-Electron Bolometer Mixers at 0.5 Terahertz* A. SKALARE, W. R. MCGRATH, B. BUMBLE, H. G. LEDUC, Jet Propulsion Laboratory, Pasadena, CAUSA, P. J. BURKE, A. A. VERHEIJEN, D. E. PROBER, Yale University, New Haven, CT USA - Superconducting hot electron bolometer mixers are an interesting option for low noise astronomical receivers at sub millimeter wavelengths, particularly at frequencies higher than 1 THz. The reason is that the bolometers should not suffer from the same performance degradation above the superconducting energy gap frequency as is observed in S1S mixers. 1 lowever, the bolometers have a limited intermediate frequency bandwidth due to the finite time. required to cool the hot electrons. We are investigating a short (<0.5) micron) niobium microbridge bolometer where the main cooling mechanism is expected to be out-diffusion of hot electrons into the surrounding (hick nc)rmal-metal gold leads, rather than phonon emission. This out-diffusion process leads to predicted intermediate frequencies as high as 4 GHz, Initial measurements using a coherent source and a waveguide receiver have confirmed mixing in the device at a local oscillator frequency of 528 GHz and with an intermediate frequency of 1.4 GHz.

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1 Presort Category: 13-5 (Mixers)

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